

often causing the haploid number to be less than fourteen (Woodworth, 1929). If this be a normal process it may indicate an affinity of homologous chromosome pairs which in turn suggests a doubling, if not of a whole chromosome set, at least of certain chromosomes. However, Yarnell (1929) has shown that we can not be too dogmatic about the idea that only homologous chromosomes pair. In an artificially produced triploid *Fragaria* he has found unmistakable pairing between non-homologous chromosomes. This also happens in *Betula Sandbergi*.

Species formation in the genus *Corylus*, since all species have fourteen chromosome pairs, might be attributed to gene mutations and other structural changes within the individual chromosomes aided perhaps by hybrids between varieties, although it has recently been suggested that gene mutations have little influence in species formation (Anderson, 1928).

Species of *Alnus* seem to be well defined, with the exception of the New England material of *A. incana* and *A. rugosa*. The existence of much intergrading material makes for obscurity in specific lines. Much of the *A. rugosa* material has very abnormal meioses in both microgametophyte and megagametophyte and the abundance of viable seed has been found to develop apogamously and to be polyembryonic (Woodworth, 1930). There is then here a correlation between polymorphism and reproductive irregularities. Some specimens of *A. japonica* have been reported as having fourteen pairs of chromosomes while others have twenty-eight pairs. Since the plants are taxonomically *A. japonica* there is no doubt that there has been a duplication of the chromosome set (autopolyploidy).

*Carpinus betulus* has eight pairs of chromosomes, while its variety *fastigiata* has thirty-two pairs. This variety obviously belongs to *C. betulus* because it differs only in its narrow pyramidal habit. The octoploid chromosome number probably originated in a four fold reduplication of the eight pairs of chromosomes (autopolyploid).

It has been mentioned above that *Betula* species are very difficult taxonomically. This is due to many intergrading forms. Fernald (1902) has shown that it is possible to trace by a series of specimens a direct connection between dwarf *B. nana*, through variants of many other species, to the tall *B. alba*. He notes that since it is obviously impracticable to regard all these forms as one species, it seems wise to recognize the more marked centers of variation as species which are admitted to pass by exceptional tendencies to other forms ordinarily distinguished by marked characteristics.